

What is claimed is:

1. A method of analyzing a thought system of a subject, said subject consisting of at least one individual, comprising the steps of:

5 obtaining a plurality of items perceived by said subject;  
obtaining relationship information of all possible pairs of said items, based on perception of said subject with respect to relationship between two items of each of said all possible pairs of said items;  
generating a relation matrix of the plurality of items based on said  
10 relationship information of each of said items with respect to the all other items;  
transforming said relation matrix to a display matrix projected on a representation space having dimensions lower than the number of said items and reflecting a relationship between said items perceived by said subject; and  
displaying said items on said representation space according to said  
15 display matrix such that said items are plotted on respective positions in said representation space.

2. A method of analyzing a thought system of a subject according to claim 1, wherein said items are represented by language.

3. A method of analyzing a thought system of a subject according to claim 1, wherein said items belong to a single group conceptually undistinguishable.

4. A method of analyzing a thought system of a subject according to claim 1, wherein said step of obtaining items is executed to obtain about 5 - 20 items.

5. A method of analyzing a thought system of a subject according

to claim 1, wherein said step of obtaining said plurality of items is arranged to obtain successively said items from said subject, while all of said items previously obtained are shown to said subject.

5           6.       A method of analyzing a thought system of a subject according to claim 1, said step of obtaining relationship information further comprising the step of showing said subject only one pair of said all possible pairs of said items in order, for allowing said individual to assign said relationship information for each pair of said items, in the same order.

10           7.       A method of analyzing a thought system of a subject according to claim 1, wherein said relationship information consists of rating of relationship between said two items of each of said all possible pairs of said items.

15           8.       A method of analyzing a thought system of a subject according to claim 7, wherein said rating of relationship consists of a plurality of rating concepts representing different degrees of said relationship.

20           9.       A method of analyzing a thought system of a subject according to claim 8, wherein said plurality of rating concepts comprise "small", "medium" and "large".

25           10.      A method of analyzing a thought system of a subject according to claim 1, further comprising the step of detecting a unique item having no relationship to all other items based on said relationship information, and deleting said unique item from said items so as to regenerate said relation matrix.

11. A method of analyzing a thought system of a subject according to claim 1, further comprising the steps of determining whether said relationship information is biased, and displaying a warning to said subject if said relationship information is biased, while comprising the step of initializing said step of obtaining said relationship information so as to recommence said step of obtaining said relationship information, as needed.

12. A method of analyzing a thought system of a subject according to claim 1, wherein said items perceived by said subject are qualitative data, while said relationship information are processed as quantitative data in said step of transforming said relation matrix to said display matrix.

13. A method of analyzing a thought system of a subject according to claim 6, wherein order of showing said one pair of items of said all possible pairs is arranged to avoid repetition of each item in consecutive pairs.

14. A method of analyzing a thought system of a subject according to claim 1, wherein said step of obtaining said plurality of items and said step of obtaining said relationship information are performed successively by said individuals in a substantially continuous time.

15. A method of analyzing a thought system of a subject according to claim 1, wherein said step of generating said relation matrix is arranged for generating said relation matrix by using values of said relationship information, said relationship information being assigned to each of said items for representing the relationship with respect to said all other items, and being set to respective elements of said relation matrix.

16. A method of analyzing a thought system of a subject according

to claim 1, further comprising a step of generating a profile matrix by dividing each element of said relation matrix by a sum of said elements of said relationship matrix, and a step of generating a transformed matrix by transforming said profile matrix based on deviation of each element of said profile matrix from the corresponding expectation of said each element of said profile matrix, said steps of generating said profile matrix and transforming said profile matrix are performed as pretreatment of transforming said relationship matrix to said display matrix.

17. A method of analyzing a thought system of a subject according to claim 1, said step of transforming said relation matrix to said display matrix, comprising a step of performing a singular value decomposition.

18. A method of analyzing a thought system of a subject according to claim 1, further comprising a step of arranging said display matrix such that values of elements of said display matrix to be weighted with respect to a specific dimension.

19. A method of analyzing a thought system of a subject according to claim 1, wherein said representing space consists of a two or three dimensional coordinate domain, and said step of displaying said items is arranged for plotting items on a corresponding position in said coordinate domain, according to said display matrix.

20. A method of analyzing a thought system of a subject according to claim 19, wherein each of said items plotted on said coordinate domain is depicted by an object the size of which corresponds to the value of relativity of said item with respect to the all other items.

21. A method of analyzing a thought system of a subject according to claim 19, wherein each of said items plotted on said coordinate domain is depicted by an object the size of which corresponds to a value of relativity of said item with respect to one of said dimension axis.

22. A method of analyzing thoughts of at least one individual according to claim 1, wherein said step of transforming said relation matrix to said display matrix further comprises the step of storing a data of said display matrix.

23. A method of analyzing a thought system of according to claim 1, further comprises the step of performing a cluster analysis using said display matrix, so as to separate said items into groups, the number of said groups being smaller than the total number of said items.

24. A method of analyzing a thought system of a subject, according to <sup>claim 1</sup> ~~any one of claims 1~~, wherein said subject consists of a plurality of individuals, said step of obtaining said plurality of items is performed for obtaining a plurality of items commonly perceived by said plurality of individuals, said step of obtaining relationship information is separately performed by said plurality of individuals for obtaining a plurality sets of relationship information based on perceptions of each of said individuals with respect to all possible pairs of said items, and said step of generating a relation matrix is performed for generating a aggregated relation matrix for said subject, by summing up said plurality sets of relation matrixes of said plurality of individuals.

25. A method of analyzing a thought system of a subject according to <sup>claim 1</sup> ~~claims 1~~, wherein said subject consists of a plurality of individuals, and said

step of obtaining said relation matrix is performed by said plurality of individuals such that said plurality of individuals share all possible pairs of said items to assign said relationship information to said all possible pairs of items.

5           26. A method of analyzing a thought system of a subject according to any one of <sup>claim 1</sup>~~claims 1~~, wherein said subject consists of a plurality of individuals, said step of obtaining said plurality of items is performed for obtaining a plurality of items commonly perceived by said plurality of individuals, said step of obtaining relationship information is separately performed by said plurality of individuals for obtaining a plurality sets of relationship information based on perceptions of each of said individuals with respect to all possible pairs of said items, said step of generating a relation matrix is performed for generating a plurality of relation matrixes based on said plurality sets of relationship information, and for generating a juxtaposition relation matrix wherein said plurality of relation matrixes are juxtaposed; said step of transforming said relation matrix is performed for transforming said juxtaposing matrix to said display matrix, and said step of displaying said display matrix is performed for plotting said items on respective positions of said representation space according to said plurality of relation matrixes for the respective individuals, and indicating the positional differences between said items obtained by one of said plurality of individuals and said items obtained by another of said plurality of individuals.

Sub B1  
25           27. A method of analyzing a thought system of a subject, said subject consisting of at least one individual, comprising the steps of:

a first step of analyzing said thought system arranged for performing said analyzing methods recited in <sup>claim 1</sup>~~any one of claims 1-24~~;

a second step of analyzing said thought system arranged for performing steps of selecting at least one of said items obtained in said first step, obtaining

a plurality of items perceived by said subject with respect to said selected items, and analyzing said plurality of items according to said analyzing methods recited in <sup>claim</sup> ~~any one of claims 1-24~~.

5           28.     An analyzing apparatus for analyzing a thought system of a subject, said subject consisting of at least one individual, comprising:

          a first input device being arranged to input a plurality of items perceived by said subject;

10           a second input device being arranged to input a relationship information between two items of each of all possible pairs of said plurality of items, according to perception of said subject with respect to said relation rating;

          a relation matrix generator adapted to generate a relation matrix based on said relationship information of each of said items with respect to the others of said items;

15           a display matrix generator adapted to transform said relation matrix into said display matrix projected on a representation space having dimension lower than the number of said items, said representation space reflecting a relationship between said items perceived by said subject; and

20           a display device adapted to display said items in said representation space such that said items are plotted on respective positions in said representation according to said display matrix.

25           29.     An analyzing apparatus according to claim 28, further comprising an external display device being arranged for visually showing said representation space in the form of two or three dimensional coordinates in which said items are plotted in the respective coordinates.

          30.     An analyzing apparatus according to claim 28, wherein said second input device being arranged to input said relationship information

consists of a plurality of terminal units connected to said analyzing apparatus via a telecommunication network, so as to allow said individual to input said relationship information by said terminal unit.

5           31.     A computer program product for analyzing a thought system of a subject by using a plurality of items perceived by said subject, said subject consisting of at least one individual, said computer program comprising:

computer code that relates each of said items to all other items, using a rating of relationship on several levels;

10           computer code that generate a relation matrix using said obtained relation ratings;

computer code that performs a multivariate analysis on said relation matrix so as to transform said relation matrix to a display matrix;

15           computer code said display the all items on respective position of a representation space according to said display matrix; and

a computer-readable medium that stores the program codes.

20           32.     A computer program data signal for analyzing a thought system of a subject consisting of at least one individual, said computer program data signal embodied in a telecommunication medium and representing sequences of instructions which, when executed by a processor, cause the processor to perform the steps of:

obtaining a plurality of items perceived by said subject;

25           obtaining relationship information of all possible pairs of said items, based on perception of the subject with respect to relationship between two items of each of said all possible pairs of the items;

generating a relation matrix of said plurality of items based on said relation information of each of said items with respect to said all other items;

transforming the relation matrix to a display matrix projected on a



representation space having dimensions lower than the number of said items and reflecting a relationship between the items perceived by the subject; and

displaying said items on said representation space according to said display matrix such that said items are plotted on respective positions in said representation space.

33. A method of forming an analyzing apparatus for analyzing a thought system of a subject as defined in claim 28, said apparatus including a computer device having a processor, said method comprising a step of:

transmitting a computer program data signal readable by said computer device to said computer device via a telecommunication medium so that said computer device functions as said analyzing apparatus as defined in claim 28.

Add  
C1